Light and Lighting

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Lighting and Office Workers

MINIMUM conditions of lighting in factories, schools and—as we noted last month—in crew accommodation on merchant vessels are now prescribed by statutory instruments, but no such " rights of light " are accorded to the great army of office workers. Is this because there are no badly lighted offices. and it would be supererogatory to make statutory requirements concerning the lighting of offices ? No, indeed ! Unfortunately, although there are many well-lighted offices, there are also many in which the natural and the artificial lighting is deplorably bad. Heaven knows, we are already beset with regulations and want no more than are necessary; but, both the Gowers Committee and the Lighting Committee of the Building Research Board—who made a survey of lighting in offices as recently as 1949—came to the conclusion that there should be a statutory obligation upon office occupiers to provide " suitable and sufficient lighting." Between one and two million persons are employed in our offices, and of the cross-section examined by the B.R.B. Lighting Committee, 37 per cent. criticised the daylighting of their offices and 41 per cent. criticised the artificial lighting ! According to a recent estimate given in a national daily paper, 10 per cent. of office workers endure working conditions that would not be tolerated in the forecastle of the worst tramp steamer afloat. We have no means of verifying this strong indictment, but the best evidence we have clearly indicates that a substantial proportion of office workers are in need of better lighting.

Notes and News

National Meetings

At this time of the year any sign of Spring is welcome. Those who take note of the habits of birds will have seen that they are already pairing-off and that the males are beginning to exercise their vocal cords; other, though perhaps less welcome, signs of the approach of Spring are Schedule "A" demands and burst pipes. But Spring is also the time when several illuminating engineering societies reach the peak of their activities and hold their annual or bi-annual conferences or meetings, and another sign that this season is approaching is given by the various announcements of the times and places of such meetings. The season begins with the German I.E.S. meeting in Berlin in March, the British I.E.S. meeting in Southport in May, and the French A.F.E. meeting in Monaco in June. Details of the British meeting have already been widely circulated, and we gather that attendance this year is likely to beat all records. The details, as far as they are known, of the German and French meetings are as follows. Visitors from other countries are assured of a warm welcome at any of these meetings.

The Annual Conference of the German Lichttechnische Gesellschaft (the I.E.S. of Germany) will be held in Berlin from March 24 to 26. The meetings, which will be held in the Berlin Technological University, begin on the Wednesday with some formal sessions of committees and the official opening of the conference by the President of the Society, Prof. L. Schneider. This will be followed by a popular lecture by Dr. H. Korte on " Light in physics and illuminating engineering."

For Thursday, March 25, there is a very full programme of eight papers, as follows:—

" Procedure and possibilities in brightness engineering," by Prof. W. Arndt.

" The alleged visual troubles under fluorescent lighting," by Prof. H. Schober.

" Biological effects of light and radiation," by Prof. R. Schulze.

" The physics and chemistry of fluorescent materials," with demonstrations, by Dr. P. Brauer.

" Gas light in signalling practice," by Dr. K. Grosskurth.

" Infra-red cinematography in twilight and darkness," by Dr. J. Rieck.

" New methods in the art of interior lighting," by Dr. D. Fischer.

" The significance of the theory of the light field in practical illuminating engineering," by Ing. J. Krochmann.

For the final day the programme consists of the reading of three papers and the Annual General Meeting of the Society. The papers are :—

" Latest developments in artificial light sources," by Prof. H. J. Helwig.

" Control of colour reproduction by means of the DIN colour chart," by Prof. M. Richter.

" The possibilities and limits of light production by means of Xenon high pressure lamps," with demonstrations, by Dr. K. Larché.

We hope to have fuller details shortly and would be pleased to supply them to anyone who is interested in this meeting.

The Summer Meeting Committee of the British I.E.S. must sometimes envy the French the choice of meeting places which they have at their disposal. The French believe, quite rightly, that technicalities can be discussed just as easily in pleasant surroundings as they can elsewhere — so this year they are going to hold their annual meeting from June 8 to 12 at Monte Carlo. Recent meetings at Toulouse and Dijon have been a great success both technically and socially; each of these meetings was arranged in conjunction with a week of floodlighting and jollification in the towns concerned—we understand that similar arrangements are to be made at Monte Carlo. Our knowledge of Monte Carlo is limited to what we have gathered from films and stories by Somerset Maugham, but we would say that the possibilities of the place for " un projet grandiose d'illuminations " are pretty good. Full details of the technical programme are not yet available, but we gather that there will be two main themes; lighting and tourism and the quality of lighting installations. Fuller details will be published as soon as they are available, or may be obtained direct from the secretary, Association Française des Eclairagistes, 33, Rue de Naples, Paris, 8e.

The popularity of these meetings grows year by year; the meetings in France now attract over 300 people, and the German meetings about the same number.

In writing the above notes it occurred to us as

odd that the European societies should hold their annual gatherings in the Spring whilst the American I.E.S. holds its annual conference in the Autumn (Fall). There is something to be said for holding such meetings at the beginning of the lighting season —American salesmanship, no doubt, and quite rightly, prefers pep talks before the campaign rather than after. In Europe it possibly takes us all the winter to whip up enthusiasm, and we find it easier to finish in a blaze of glory than to start with one. (It may also be that we are so glad to see the end of the lighting season; or even that we in Europe, in spite of our wonderful artificial light sources, are still sun-worshippers and in the Spring we rush to such exotic places as Monaco and Southport to celebrate the return, or hoped-for return, of the sun.) Incidentally, we recall that the Australian societies hold their national conference in November—which, if you can work it out, is in the Spring.

The Colour Group

At the meeting of the Physical Society Colour Group held on January 6 in the rooms of the Royal Photographic Society two papers were presented. The first was by Dr. W. C. Price of King's College, London, who dealt with modern theories of the colour of organic molecules. He said that, although the quantum theory of absorption was somewhat mathematical, the simplified "free-electron" approach enabled the main features of the absorption of conjugated systems to be understood with a minimum of mathematics. To Dr. Price, no doubt this was so, but to his audience it soon became apparent that the "minimum" needed was a good deal greater than their individual maxima "and still they gaz'd and still the wonder grew, that one small head could carry all he knew."

In sharp contrast, Dr. R. W. G. Hunt gave a very lucid talk on the use of coloured couplers to overcome unwanted absorptions in colour photography. The cyan dye, he said, had unwanted absorptions in the green and blue parts of the spectrum, and the magenta dye an unwanted absorption in the blue part. The effects of these unwanted absorptions in coloured negatives had recently been overcome in America by the use of dye-forming couplers (substances which reacted with the developer) which were themselves coloured. Dr. Hunt showed some very interesting examples of results obtained by means of this new technique. He pointed out that it could only be used in a positive-negative process not for the usual positive colour transparency. In reply to a question from Mr. Cartwright, he said that a resolution of 100 lines per millimetre was attainable.

Eyestrain in Cinemas

Thirty years ago, at the request of the London County Council, the I.E.S. set up a committee to look into the question of eyestrain in cinemas. The committee issued a report in 1920 which made recommendations affecting seating arrangements in cinemas. The recommendations were (i) that the angle of elevation, subtended at the eye of any person seated in the front row, by the length of the vertical line dropped from the centre of the top edge of the picture to the horizontal plane passing through the observer's eye shall not exceed 35 deg., the height of the eye above the floor-level being assumed to be 3 ft. 6 in.; and (ii) that provided recommendation (i) is complied with, the angle between the vertical plane containing the upper edge of the picture, and the vertical plane containing the observer's eye and the remote end of the upper edge of the picture should not be less than 25 deg.

It is perhaps surprising that since 1920 nothing has happened in the cinema industry to warrant any reconsideration or amendment to these recommendations until quite recently, when new cinema techniques involving wider screens and three-dimensional effects were introduced. It was obvious that these developments would have some effect on seating arrangements and that those positions in the theatre which were just tolerable with normal films would now become intolerable even though only just.

This time, without waiting to be asked, the I.E.S. decided that here was a job to be done, and a representative committee similar to that of 1919 was set up to reconsider the 1920 recommendations and to decide what changes, if any, should be made. The committee, under the chairmanship of Dr. W. J. Wellwood Ferguson, has made a number of visits to cinemas to see the new systems under varying conditions. As it is understood that licensing authorities are anxious to have advice on the subject as soon as possible, the committee has just issued an interim recommendation as follows :—

"Where wide screens are used, the existing recommendations regarding limiting angles of view should be strictly observed where child audiences are concerned. If the screen is curved the minimum recommended lateral angle of view, which is 25 deg., may be measured from the tangent to the curve. For adult audiences, during the present experimental period, the existing recommendation may be relaxed to allow minimum practical utilisation of existing seating."

The committee includes representatives of the Illuminating Engineering Society, the London County Council, the Faculty of Ophthalmologists, the British Kinematograph Society and the Physiological Society.

Fluorescent lighting in the market place of a small German town.

Notes on Lighting in New Zealand

By J. N. HULL, B.Sc., F.I.E.S.

Nelson City, showing typical New Zealand wide roads and rectangular layout.

Research and Natural Resources

The Dominion Physical Laboratory is the largest branch of the New Zealand Department of Scientific and Industrial Research, and is responsible for the custody and maintenance of the legal standards of physical measurement. Standards are held covering the measurement of electricity, light, temperature, length, and mass and their derived quantities. In addition, the laboratory uses its facilities for research into, and development of, the country's natural resources and for the assistance of both primary and secondary industries. In the Photometry Section a laboratory has been established for accurate measurement of light and colour, and a service is being provided to other Government laboratories and industry on a wide variety of problems touching the use of light, colour and ultra-violet radiation.

New Zealand's wealth comes mainly from its primary production—wool, dairying, meat and timber. It is natural, therefore, that much of the research effort should be applied to the agricultural and pastoral industries. Light is an essential component of the growth of trees and of the grass which the animals eat, so that botanists and biologists engaged on these researches need to know about the light and associated ultra-violet and infra-red radiations which occur naturally. They then often have to simulate these radiations in the laboratory. Many of the laboratory experiments, incidentally, do not require the very large temperature, humidity and light-controlled rooms which are used by some workers; important developments have come from quite small laboratories, for example, those at Palmerston North, about 100 miles north of Wellington, where work in cabinets only a few feet square is supplemented by tests in experimental plots outside. Certified seeds of strains of grass developed there in the past are exported to the value of £2,000,000 annually, which is nearly 1 per cent. of the country's total exports.

The basic photometric instruments at the Dominion Physical Laboratory are a conventional photometer bench, a sphere and a spectrophotometer. Candlepower and luminous flux measurements depend upon sub-standard lamps calibrated by the National Physical Laboratory, while radiant energy is usually measured by reference to thermopiles also calibrated by the National Physical Laboratory.

The laboratory is equipped with a 20-ft. photometer bench and a 10-ft.-diameter sphere has been designed to go at the end of the photometer bench, but it has not yet been made. The design of the sphere has been quite interesting, as it was decided to use local skills in its manufacture, to avoid transporting so bulky an object from overseas. As now designed, laminated wooden hoops will support a multiskin lath and plaster surface, and the whole structure will sit in a large, shallow egg-cup.

In spectrophotometry, close control of the temperature is often desirable for the instruments and sometimes for the components under test such as filter glasses and photo-cells. The Müller-Hilger Double Monochromator has therefore been installed in a room (see Fig. 2) where the temperature is held to ± 1 deg. F. The integrating sphere is intended for testing the spectral energy output of light sources. It was constructed in the laboratory workshops from plaster supported by wooden ribs. The monochromator has seen much service during the year

Originally presented as a lecture at a meeting of the I.E.S. in London.

or two it has been operating, in the development of a number of light- and radiation-meters, and its sensitivity has recently been increased by building in a galvanometer amplifier. Those are the basic instruments from which a number of special instruments have recently been developed for particular applications.

Plant Growth

Before light can be applied intelligently to an experiment involving plants or animals it is usually necessary to know something about the light, or, to be more precise, the radiant energy which they receive in their natural surroundings, and also its effects upon them. There are, of course, many portable instruments of various types available for measuring light, but the spectral response of most is designed to imitate that of the human eye, and they may therefore give misleading indications of the effects of the energy on, say, a plant. While the spectral sensitivities of particular plants are not known with any certainty it seems likely that they respond almost equally to red and blue light and have a somewhat lower response to green light. The sensitivity curve of a wheat plant measured by Hoover in 1937 has been published; by working on somewhat incomplete information of this kind, a start has been made on a range of instruments for the research botanists and biologists, some with a spectral response approximating to the subject of the investigation.

One instrument counts the quantities of radiant energy in the visible region falling on a horizontal surface. The horizontal surface is a piece of depolished opal glass mounted beneath a hemisphere of clear glass to protect it from the weather. A small photoemissive cell is situated below, with glass colour filters interposed. In this case the spectral sensitivity of a caesium-oxygen-silver photocell was adjusted to an approximately equal sensitivity from 0.4 to 0.7 micron with no sensitivity elsewhere. The instrument is intended for daylight surveys in areas where grasses and clovers will be sown for pasture. It will be left on a site for days or weeks and, using dry batteries and a counting circuit consuming very little power, will integrate the radiation received over the period. This instrument takes no account of the variation of the spectral distribution of the energy within the limits of 0.4 to 0.7 micron, but information on the variation of the distribution has been gathered for most types of weather using a manually operated spectrophotometer, a description of which and of the results obtained has been published in the I.E.S. Transactions.*

These instruments measure the radiation falling on top of the pasture. Going a stage further, when the grass has become established, interest centres on the perpetuation of the pasture which often relies upon the clover (to fix nitrogen) growing below the grass cover. The radiation falling on the clover depends upon the density of the grass, and if it is sown on to existing grass the young clover seedlings may not become established presumably due to lack of radiation for photosynthesis.

A similar situation arises when marginal land is being developed in hill country. The bracken or scrub may be broken down by flails, and grass and clover sown from the air. It has to survive beneath the debris. To investigate the proportion of the radiation which penetrates, a "pasture transmission meter" has been

* Trans. Illum. Eng. Soc. (London). Vol. XIX, No. 1 (1954).

Fig. 2. Part of the Photometry Section at the D.P.L.

Fig. 3. Interior of a multiple store.

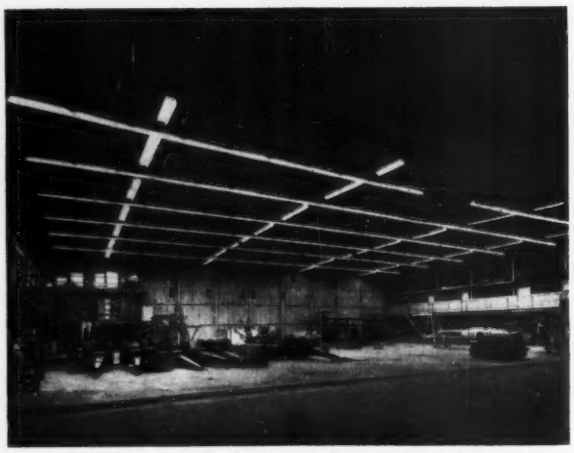


Fig. 4. Repair hanger at Auckland flying-boat base where two-lamp 5-ft. fluorescent luminaires are used giving 40 lm./ft².

Fig. 5. Victoria-street, Hawera, Taranaki. Note power and post office poles.

Fig. 6. Example of "community" lighting under shop verandas.

Fig. 7. Fluorescent lighting on Queen-street, Auckland.

developed. It again operates on a counting system, integrating separately the radiation falling on two photo-emissive cells in housings approximating to a horizontal surface and with colour correcting filters. One photocell is placed above the pasture and one below it, the shape of the photocell housing being chosen to disturb the plants as little as possible. This instrument is designed to run for some hours from a car battery. A similar type of instrument with miniaturised electronic components operating from dry batteries is being used for the same type of measurement in forest undergrowth. For quick and somewhat approximate measurements in pasture surveys, some miniature selenium photovoltaic cells have been sealed into an opal "Perspex" housing which can be used below even a fairly short pasture without much disturbance.

Having discovered what radiation is available in Nature it is possible to design experiments on seedlings in a controlled environment, to sort out what variables are important and then find strains of grass and clover likely to flourish in that radiation. At this stage, too, a suitable field management practice can be developed. The controlled environment is set up in a lagged cabinet where seedlings are subjected to the radiation, temperatures and humidities which imitate those which have have been measured in the surveys. In the cabinets radiation densities of up to about 100 W./m.^{2} on about 2,000 lm./ft.^{2} of white light are provided. By automatic switching the amount of radiation can be changed along with the temperature and humidity to correspond with a daily cycle and different types of weather. The emphasis is on flexibility rather than size. With three or four cabinets differently adjusted the plant chemist can quickly investigate the suitability of a new strain of plant for the area where it is likely to be sown.

Interior Lighting

The foregoing gives some idea of how light- and radiation-measuring instruments are being applied to pastoral research in order to utilise to the full the abundant sunshine with which New Zealand is blessed. There have been notable advances, too, in the use of artificial light in recent years. British visitors to New Zealand are often surprised to see how widespread is the use of fluorescent lighting in shops, offices, restaurants and hotels. Electricity is cheap and plentiful so it is unlikely that the increased efficiency alone of the fluorescent lamp has ousted the tungsten lamp. The probability is that owners of commercial premises have adopted fluorescent lamps without question just as they have adopted plastic-topped counters or new adding cash registers. In some ways the approach has been over-enthusiastic and the familiar errors of having too many bright sources in view, or an unsuitable colour for the particular situation, are often evident. The choice of lamp colours can be quite embarrassingly wide, because the most common mains voltage fluorescent lamps are of British and Dutch origin, plus some remaining stocks of American lamps. High-voltage fluorescent lamps are being made in New Zealand. Lighting equipment, too, is somewhat bewildering in its diversity. While many of the components, such as control gear, lampholders, and glassware are imported from Britain or Australia, there is an appreciable and probably growing local production

of gear. The more popular types of interior lighting fittings are made in New Zealand and quite a number of the decorative fittings are designed there.

Some of the multiple stores have recently opened new premises or reconditioned their older shops, using continuous lines of fluorescent lamps to replace the familiar rows of tungsten filament lamps in prismatic glass shades. Where the new ceiling is unobstructed cross-louvred fittings with diffusing sides are mounted directly on to it. There are usually two rows of 4-ft. or 5-ft. lamps in each continuous fitting. Where there are ceiling beams similar continuous fittings are used just below the beams, or 8 ft. 1½ in. diameter lamps are used shielded from view along the store by kidney-shaped louvres. As these stores are usually long and narrow the unobstructed view of the lamps in the other direction is not considered important. The bulky control gear is grouped and mounted on the beams.

Departmental stores and smaller shops are installing new lighting, all basically fluorescent, but usually supplemented by tungsten filament spotlights in eyeball mountings. The high voltage or mains voltage fluorescent lamps are often placed in coves, cornices, or laylights in the conventional way which is becoming common practice in most countries.

Fluorescent lighting is not considered economical for general use in schools owing to the small number of hours during the year when it is needed and the low cost of electricity; simple tungsten-lamp fittings are employed. Fluorescent lighting may, however, be justified where it is required to supplement daylight as, for example, in art rooms.

Although New Zealand has little industry there are a number of factory buildings, medium to small by British standards, for such purposes as assembling motor-cars, fabricating steel plate, and making clothing. The older ones have tungsten filament lighting; mercury or sodium lamps are often used in the heavier engineering shops. More recently mercury-fluorescent or mercury-tungsten lamps have replaced some of the tungsten lamps in conventional installations. It has been estimated that half the new industrial lighting installations are fluorescent.

Street Lighting

The street lighting problem is a difficult one, and the solutions found for British roads do not necessarily apply. When many New Zealand towns and cities were laid out the standard road was often one chain (66 ft.) wide, even in the purely residential areas, and the rectangular pattern was normally adopted. There is usually a row of power poles spaced at chain intervals down one side, Post Office poles down the other, and often a number of cars parked along each side all night. In shopping areas the verandahs along each side of the road either shadow the footpath from side-mounted street lanterns or, where under-verandah "community" lighting fittings are installed, may provide a row of glare sources in competition with the regular street lighting.

The straightness of the roads combined with their width makes a dark centre difficult to avoid without using central lanterns, but islands are rare and heavy lanterns are difficult to support on wire spans of, say, 50 ft. There seem to be several systems in vogue, the simplest being a series tungsten filament (60-, 100- or 150-watt) installation running down one side of the street. This is a very economical system and is often the only type which can be afforded or which the ratepayers' interest will support in the widely spaced, small town with its low density of population. Vertical mercury or mercury-fluorescent discharge lamps in refractor bowl lanterns, or horizontal sodium lanterns, are occasionally used for the busier traffic routes. Sodium lamps are also inserted in tungsten filament installations to denote particular hazards. In the shopping centre of a town the vehicle and pedestrian traffic density can be very high on Friday night, when the shops stay open until about 9 p.m. A favoured system here is staggered side mounting with overhang, using 500-watt tungsten filament series lamps in refractor bowl lanterns with a distribution considerably off axis. The spacing is often quite close, but is rather at the mercy of the irregularly spaced power or Post Office poles, and mounting heights up to 30 ft. are used. The lighted shop windows often make a big contribution to the street lighting, but are not, of course, a very reliable factor in a lighting design. Community lighting gives excellent pathway illumination and kerb marking from tungsten-filament lamps in opal globes or bare twin 40-watt fluorescent lamps, in the latter case usually 10 lm./ft.^{2} or more at the centre of the footpath and five at the kerb. As sometimes placed, however, it constitutes an annoying glare source when one is looking at the road surface, which is already too dark in the centre. There seems to be scope for a novel approach to find an overall plan for street and community lighting. Fluorescent street lighting is now being installed in a number of New Zealand cities, and even the small towns often have a few fluorescent lanterns along the straight main shopping street. An unusual problem has been Queen Street, Auckland, where tramcars occupy the central third of the very wide carriageway on a steep grade with numerous intersections. There are verandahs over the shops and community lighting underneath. The side-mounted fluorescent street lanterns, mostly on 25-ft. steel poles, are spaced about 100 ft. Although no lighting system could make it a pleasure to drive along on a late shopping night, the whole effect, with shop windows lit up and verandah lights and street lanterns on, looks very pleasant.

New Fluorescent Lamps

The Electric Lamp Manufacturers' Association announce that on March 1 its members are introducing a lamp with a new colour and at the same time making a considerable improvement in the efficiency of Warm White lamps.

The new lamp, to be known as De Luxe Warm White, gives a light resembling that of tungsten filament lamps in both its appearance and its rendition of colours; one advantage therefore is that it will blend very satisfactorily with light from tungsten filament lamps. Practical experiments show that the new lamp is eminently suitable for lighting of premises where the public congregate for either leisure or business; accordingly it should mean an increase in fluorescent lighting particularly in homes, restaurants, hotels and shops.

The other new development is in connection with the Warm White lamp which has been improved in efficiency, the 80 watt size by as much as 15 per cent.; at the same time the colour appearance will be better. Prices will be unchanged and to ensure that these lamps are obtained they should be ordered as New Warm White.

German Fluorescent Street Lighting Fittings

By E. REBSKE

Only after the end of the war did it become possible for Germany to start repairing, little by little, the great havoc which had been wrought in the street-lighting installations of the country. The need for this became urgent because of the increase in traffic and the consequent regrettable rise in the number of traffic accidents. During recent years, following developments in England and other Continental countries, fluorescent lamp fittings have been adopted more and more for street lighting. As might be expected the number of new installations of fittings with filament lamps and with h.p.m.v. lamps is still considerable. Their construction and lighting characteristics, however, do not exhibit any noteworthy novel features, so that no account of them need be included in this article.

The street-lighting fittings for fluorescent lamps may, perhaps, be divided into two groups. The first group consists of those which are mainly functional in character, while those in the other group are decorative as well.

The fittings in the first group are intended for ordinary street-lighting purposes. They should, therefore, give an adequate and uniform illumination, free from glare, ensuring the greatest possible safety for traffic.

Fig. 1 shows a lighting fitting which is typical of this group. It goes without saying that in a fitting of this kind, too, considerable value is set on attractive and clean design, harmonising with the appearance of the street whether the fittings are suspended from span wires or mounted on columns. Generally not more than three fluorescent lamps are mounted in a fitting of this type.

An example of the second group of fittings is shown in Fig. 2. These are mounted on columns from 33 to 46 ft. in height and so the use of span wires, which are often unsightly by day, is avoided. The larger fittings in this group are specially suitable for the lighting of squares and wide streets because of their large flux output and wide distribution. The smaller fittings, with six to sixteen 20-watt or two or three 16-watt fluorescent lamps, are commonly used for lighting side roads and roads through parks. They are mounted at heights of 11 ft. 6 in. to 20 ft.

It will be understood that there is no sharp distinction between the fields of application for fittings of these two types. Lighting installations which are both technically

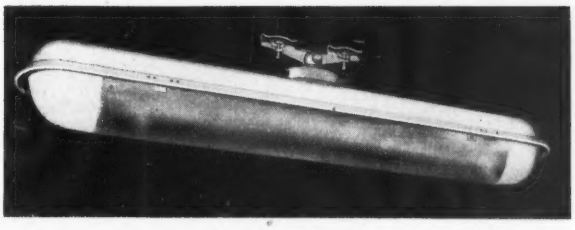


Fig. 1. Non-cut-off fitting for two or three 40- or 65-watt fluorescent lamps. Aluminium mirror, plexiglass cover and focusing device.

Fig. 2. Roundabout with large "roof-top" fitting equipped with sixteen 40-watt lamps in the stem and sixteen 20-watt lamps in the roof.

Fig. 3 (*top left*). *The Lombards Bridge at Hamburg. Fittings are* 3 × 40-*watt; spacing* 82 *ft.; height* 28 *ft.; carriage-way width* 40 *ft.*

Fig. 4 (*top right*). *Daytime view of same bridge.*

Fig. 5 (*left*). *Bridge lighting at Celle with four large "roof-top" fittings each of which houses sixteen* 40-*watt lamps in the stem only.*

Fig. 6 (*bottom left*). *Method of arranging fittings parallel to the direction of the street.*

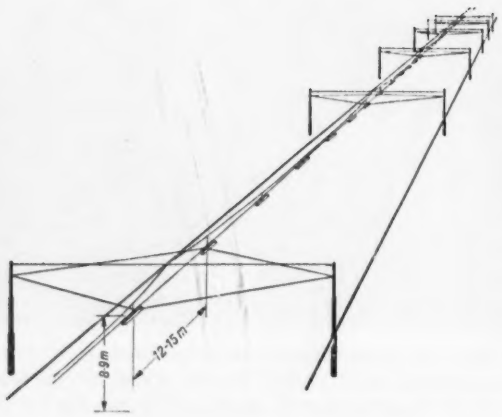


Fig. 7 (*bottom right*). *Street lighting with fittings (containing one* 40-*watt lamp) arranged parallel to the direction of the street. Spacing* 40 *ft.; mounting height* 29.5 *ft.; illumination* 1—0.5 *lm./ft*^{2}.

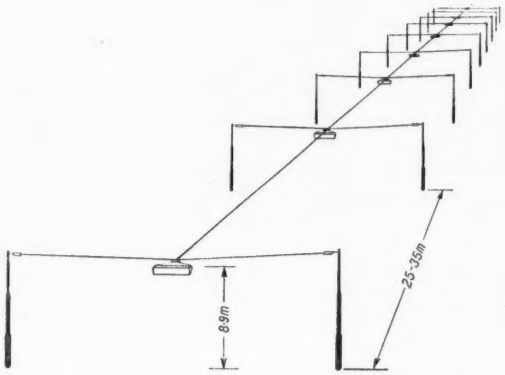


Fig. 8 (*above*). *Method of arranging fittings at right-angles to the direction of the street.*

Fig. 9 (*right*). *Street lighting with fittings arranged as in Fig.* 8. *Spacing* 98 *ft.; height* 30 *ft.; illumination* 0.9—0.45 *lm./ft*^{2}. *Fittings each contain one* 40-*watt lamp.*

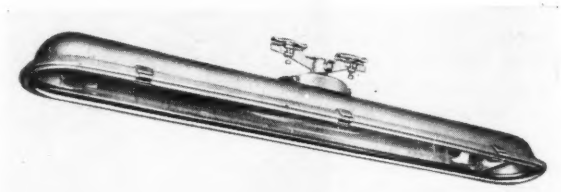


Fig. 10 (*left*). *Cut-off fitting for one* 40-*watt or one* 65-*watt lamp, aluminium mirror, glass cover, focusing device.*

Fig. 11 (*left*). *Daytime view of installation of fittings, using* 3 × 40-*watt lamps mounted on one side of street. Only the first fitting can be seen; others are concealed by foliage.*

Fig. 12 (*above*). *Night view of installation shown in Fig.* 11. *Note absence of harsh shadows in spite of foliage.*

satisfactory and pleasing in appearance can be designed with both types of fittings. By way of example, Figs. 3 and 4, showing the lighting of a bridge with street fittings on steel columns bent over at the top (Peitschenmasten), may be compared with Fig. 5, showing a bridge with large "roof-top" fittings.

As soon as the first streets in Germany were equipped with fluorescent lamp fittings the question was raised whether it was more correct to arrange the fittings parallel to the street or at right angles to it. The method adopted for mounting parallel to the street is shown in Fig. 6 and the night-time appearance of such an installation will be seen in Fig. 7. The arrangement of lanterns at right angles to the street is shown in Figs. 8 and 9. For the longitudinal arrangement, fittings giving a downward concentration of the light are preferred (Fig. 10), while for the other arrangement fittings giving a wider distribution and some light above the horizontal are favoured (Fig. 1). On purely theoretical grounds the more concentrating fittings, and therefore the longitudinal arrangement, have the advantage of greater efficiency. Often, however, the emission of some light above the horizontal is considered desirable, for example, in order to illuminate the fronts of houses better. Other matters, too, may have to be taken into consideration. For instance, it is important to decide how far existing installations may be made use of and whether it may be possible to attach the span wires to the houses. In fact, both methods of arranging the fittings have their proper fields of application, and in each individual case the best solution must be arrived at after all the relevant conditions have been taken into consideration.

It will be understood that these fittings can be mounted not only on span wires but also on brackets attached to columns (Fig. 5). In this connection another advantage of street lighting fittings with fluorescent lamps must be mentioned. That is their use for the lighting of tree-lined streets. Fig. 11 shows the daytime appearance of a street where on the left-hand side the fittings are mounted on the arms of steel columns bent over at the top. The first fitting is clearly seen, but the others are almost entirely obscured by the foliage. Nevertheless, at night the street

Fig. 13 (*right*). *Cross-road fitting with twelve* 20-*watt lamps mounted above centre of road junction.*

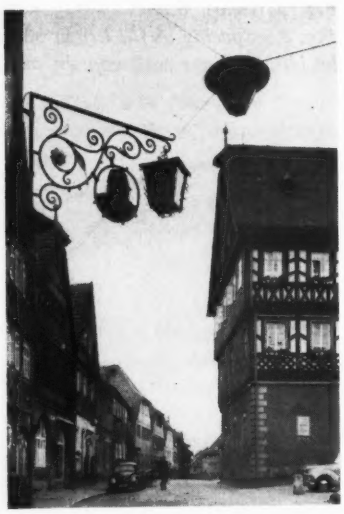


Fig. 14 (*bottom left*). *Modern type of lantern for six* 20-*watt lamps.*

Fig. 15 (*bottom centre*). *Old picturesque glass lanterns fitted with bare filament lamps.*

Fig. 16 (*bottom right*). *Bridge lighting lantern which harmonises well with the mediaeval style of the town—though hardly fulfilling the requirements of good street lighting.*

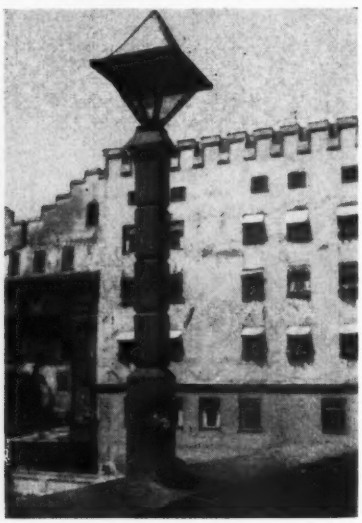


Fig. 17. *Large "roof-top" fitting in the Hagenmarkt, Brunswick.*

Fig. 18 (*above*). *Wall mounting fluorescent lantern for use in narrow streets.*

surface is well illuminated and there are only comparatively weak shadows between the trees (Fig. 12). In this case the elongated form of the fittings is a great advantage, and a similar effect could not be obtained with fittings using filament lamps.

At important road junctions the ordinary arrangement of fittings is not always the best. Such a junction should be made conspicuous to drivers by the lighting. With this in view, different methods of arranging the fittings and different types of fitting design have been tried. A very interesting and technically satisfactory solution of the problem is shown in Fig. 13. Here the fluorescent lamps are arranged almost vertically in the fitting. The span wires, which may be run as convenient, are fixed to a ring at the top of the fitting. These fittings are also useful at the junctions of streets lighted with filament or h.p.m.v. lamps, because the difference in the colour of the light makes the junction clearly distinguishable at a considerable distance.

The large "roof-top" fittings mentioned at the beginning of this article (Fig. 2) are used especially for the lighting of city squares, railway stations, boulevards, exhibitions, etc. The smaller fittings of this kind (Fig. 14) are used for narrower streets, gardens and open-air restaurants.

Towns and streets with buildings of historical interest requires special consideration. The old lighting fixtures are abandoned only with reluctance (Figs. 15 and 16) in spite of the fact that these fixtures are often fitted with filament lamps to-day. However, it is just these bare filament lamps which, taken in conjunction with their low mounting height, are so unsuitable for modern traffic because of the glare they cause and the inadequate illumination they provide. In such situations the large roof-top fittings (Fig. 17) are coming more and more into favour on account of their architecturally harmonious design. In narrow streets, small fittings mounted on wall brackets (Fig. 18) are being used.

Die Elektro-post

This journal, which appears every 10 days and is devoted to electrical technologies of all kinds, issues from time to time special numbers devoted to lighting matters and sub-titled "Licht und Beleuchtungstechnik" (Light and Lighting).

The articles in these numbers cover a wide range of subjects and are by German authors well known in the lighting world, the treatment being generally such as to make the article a review of modern practice in some branch of illuminating engineering. For instance, in the current issue, dated January 20, there is an article by Dr. A. R. Meyer on German participation in the work of the C.I.E. and a very fully illustrated one by E. Wittig on lighting practice in other countries. Collaboration between architect and lighting engineer is the subject of an article by Prof. H. Noth, while Dr. H. Herwalt and Dr. H. Schmidbauer contribute two articles on lighting fittings, the former describing some very modern designs while the latter deals with the use of plastics for fittings, luminous ceilings, etc. There is also a very interesting article by W. Kaiser on lighting at the German gymnastic festival recently held in Hamburg. Both the floodlighting of the town and the arena floodlighting used for the displays are described in some detail.

In the previous number (September 27, 1953) there were articles dealing with lighting economics, shop, school and exhibition lighting and luminous signs. Fluorescent lighting was treated in two articles, one concerned specially with its application in the textile industry.

Each number contains a four-page classified bibliography of lighting literature in which it is interesting to note the large number of references made to articles published in *Light and Lighting*.

Electric Lamp Filament Examination

By G. WRIGHT*

To meet the exacting specification of the modern electric lamp, it is necessary to control the filament dimensions before actual assembly in the bulb. For the "coiled coil" type of lamp for instance, the diameter of the tungsten wire, the pitch and the total length of the helix, are all important factors. Each turn must be accurately spaced otherwise hot-spots or shorting-out may develop and so reduce the effective life of the lamp. On the smallest size of filament the overall diameter of the coil may be little more than the thickness of a human hair and the size of the gap between the turns of wire of the order of six thousandths of a millimetre.

The examination of these filaments in bulk presents a problem which relies upon acquired skill and adequate lighting for its accurate observation. The work-room is partially darkened and the filaments are laid out on an opal glass plate uniformly illuminated from below by means of a strip light. Oblique top lighting of the filaments is also provided by a strip light.

Approximately 200 filaments from a batch are handled at a time and with a series of deft strokes and pats, the examiner arranges the filaments side by side with all the ends in line. After the removal of any filaments which vary from the standard length or which show other obvious defects, the batch is ready for the main examination.

With the aid of a pair of fine tweezers, a needle and a set of pocket magnifiers, faults such as close, open or uneven turns show up against the illuminated background. Systematic departures in pitch uniformity are observed as a "watered-silk" effect when filaments are lined up side by side—the amount of light from below passing between the interstices of the coil according to the difference in pitch along the filaments.

An experienced examiner can inspect up to 20,000 filaments a day, and on the average will reject about 1,000 faulty ones. To demonstrate the high degree of observation which can be developed, one examiner was given a small test batch of fine filaments containing 25 per cent. spiralled to the same specification as the bulk with the exception that the pitch of the coil was deliberately wound one thousandth of a millimetre oversize. The examiner bunched them together on the illuminated opal glass sheet, and after scrutinising them through a magnifying glass, immediately reported that the filaments were mixed. The small difference in pitch was discernible as a rippled effect where overlapping of the filaments occurred —as shown in the photograph.

Eyestrain, which might result from such prolonged concentration, is avoided by an occasional glance at more distant and prosaic objects providing a change of focus; most examiners agree, however, that when work is over they find relaxation in outdoor activities, dancing or the cinema.

* Siemens Electric Lamps and Supplies, Ltd.

Fig. 1. (above) Filament examination.

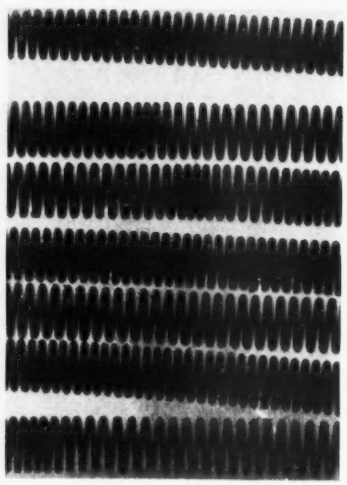
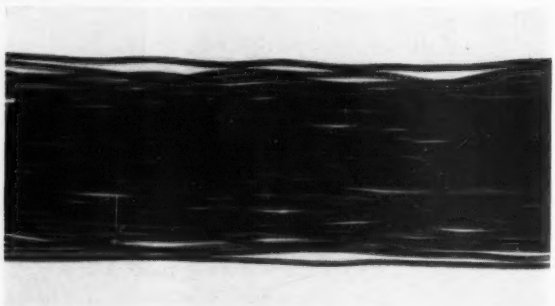


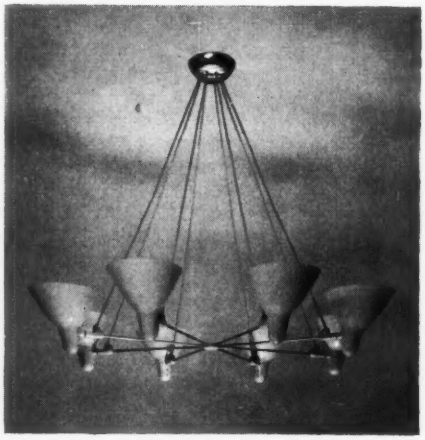
Fig. 2. Showing pitch variations.

Fig. 3. (below) Showing ripple effect due to pitch amination



LUMINAIRES

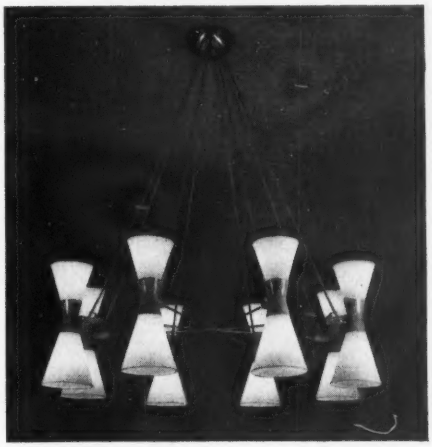
No. 4



"Versalite" radial pendant (FV.148/R) consists of a centre boss from which radiate eight tubular arms each carrying a spun metal reflector; eight flexible T.R.S. suspensions terminate in a spun ceiling plate. Available with smaller reflectors of the same pattern or with "Versalite" reflectors or shades and with three, four or six lights.

TROUGHTON AND YOUNG (LIGHTING) LTD.

Price £32 13s. 6d. (P.T. £6 2s. 6d.)



"Mondolite" radial pendant (F.828/2) is of the same general design as that above. At the end of each arm is attached a special two-way spinning to which the shades are attached. Available with different types of reflectors or with pleated plastic shades and with three, four or six lights.

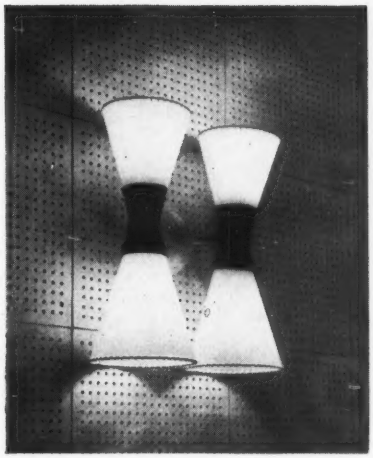
TROUGHTON & YOUNG (LIGHTING) LTD.

Price £26 11s. 6d. (P.T. £4 19s. 8d.)

The "Mondolite" ring pendant (F.1124) uses white flashed opal open base glasses in either the pendant position or the reverse as shown. Also available with three, six or eight lights.

TROUGHTON AND YOUNG (LIGHTING) LTD.

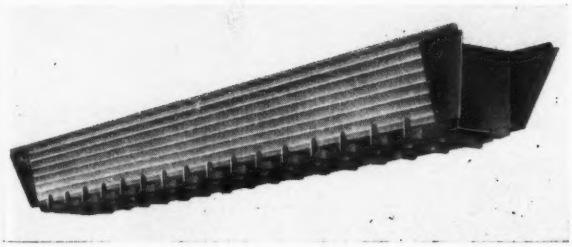
Price £14 19s. 6d. (P.T. £2 16s. 2d.)



The "Mondolite" bracket (F.956/2) is a two-light wall bracket employing the same two-way spinning as the F.828/2; similar variations of shades and reflectors are available.

TROUGHTON AND YOUNG (LIGHTING) LTD.

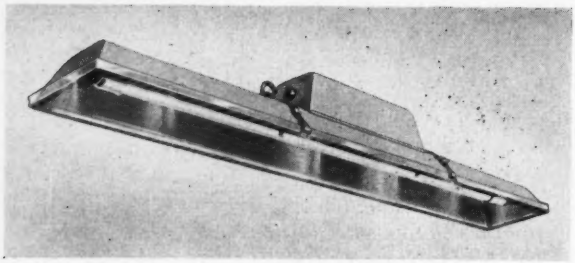
Price £6 14s. 6d. (P.T. £1 5s. 3d.)



The "Edilux," for two 80-watt fluorescent lamps, consists of a standard channel, containing control gear, and aluminium end plates which carry a steel louvre giving 25/35 deg. cut-off. Glass panels are of "Reedlyte" with sand blast finish. Panels and louvres are removable for cleaning. Standard finish in white or grey —other colours available to order.

THE EDISON SWAN ELECTRIC CO., LTD.

Price £18 15s. 0d. (P.T. £2 6s. 8d.)



A new Mazda "Perspex" closure for use with industrial fluorescent trough-type reflectors is pressed from a single sheet of "Perspex" and attached directly to the reflector by aluminium and rubber straps. Its use is primarily to prevent the possibility of glass from a broken lamp falling into a product handled beneath it, and secondly to keep the product and dust out of the fitting.

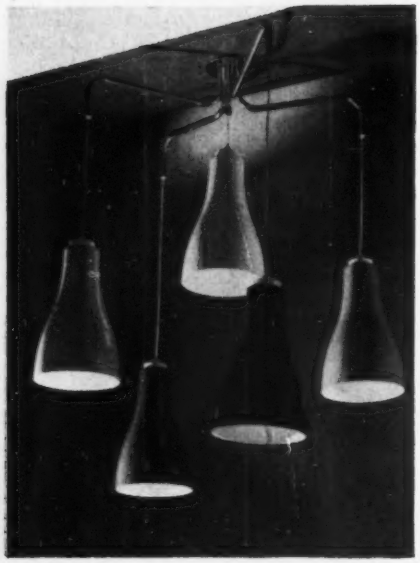
THE BRITISH THOMSON-HOUSTON CO., LTD.

Price £6 0s. 0d.

The two luminaires shown here are from 11 new designs by Beverly Pick. The designs have been freely based on traditional forms, and whilst intended for contemporary settings blend with all styles of decoration. All feature stove enamelled wire as part of the decorative treatment. Seven of the new range are table lamps and four suspension lamps.

THE GENERAL ELECTRIC CO., LTD.

Price (Left) £3 0s. 0d. (P.T. 10s. 0d.)
(Right) £3 15s. 0d. (P.T. 12s. 6d.)



Five light fitting, metal work polished brass, metal reflectors painted in various colours. Sufficient flex supplied to enable drop of reflectors to be adjusted according to the height of the room. Also available with three or four lights.

OSWALD HOLLMANN.

Price £8 17s. 0d. (P.T. £2 19s. 0d.)

Wall bracket on desk fixture. Flexible tube and other metal of satin brass; reflector painted metal.

OSWALD HOLLMANN.

Price £3 8s. 3d. (P.T. 11s. 4d.)

Lighting Abstracts

LAMPS AND FITTINGS

621.327.43

29. Effect of ambient temperature on light output of fluorescent lamps.

C. M. HOLDEN. *Illum. Engng.* **48,** 645-649 (*December,* 1953).

American published data on the relationship between the ambient temperature and light output of a fluorescent lamp have not previously distinguished between different types of lamp. This aspect is dealt with in the present paper, five of the more popular types of lamp in use in America to-day being considered. The relative light outputs of the lamps are given in graphical and tabular form for ambient temperatures ranging from −20 deg. F. to +200 deg. F. Details of the measuring apparatus are described. P. P.

621.32 : 77

30. Some applications of high speed motion picture photography to lamp manufacturing.

I. S. GOODMAN. *Illum. Engng.* **48,** 620-624 (*December,* 1953).

Describes the applications which have been made of high speed cine-photography (1,000-10,000 frames per second) to the study of problems in the design and manufacture of lamps. These problems include the vibration and impact testing of lamps for vehicles, the short-term discharge characteristics of high-pressure mercury-vapour lamps and the operation of photoflash lamps, including the mechanism of bulb explosions, P. P.

LIGHTING

628.973

31. A new lighting cabinet.

A. G. STENZEL AND A. ZIMMERMANN. *Lichttechnik,* **5,** 405-407 (*Dec.,* 1953). *In German.*

The authors describe a box some 32 × 24 × 17 in. in size and weighing 110 lb. by means of which the fundamental principles of lighting can be demonstrated. Ten different kinds of light sources are provided, with a considerable quantity of control gear. A wiring diagram is given. The demonstrations possible include (i) Light distribution and shadow, (ii) Luminance and glare, (iii) Contrast sensitivity, and (iv) Speed of perception, both as functions of luminance, (v) Flicker sensitivity, (vi) Stroboscopic effect and its amelioration, (vii) Illumination and voltage, (viii) Utilisation factor, (ix) Addition of colours, (x) Colours of different sources, (xi) Colour rendering and, finally, (xii) Various lighting effects in shop windows. J. W. T. W.

628.972 : 778

32. Photographing fluorescent lighting installations in colour.

W. ALLPHIN. *Illum. Engng.* **48,** 639-641 (*December,* 1953).

The types of colour film available and the methods of viewing colour transparencies are described and acceptable variations in the appearance of colour photographs are discussed A study is described which was designed to find out the most suitable filters to use in conjunction with colour film to give optimum reproduction of scenes illuminated with fluorescent lamps. Six types of film and the illumination from fluorescent lamps of seven different colours have been studied P. P.

628.972

33. Prefabricated coffer ceiling.

L. S. HARRISON. *Illum. Engng.* **49,** 625-628 (*December,* 1953).

Describes a system of indirect lighting whereby a false ceiling is made up of a number of coffers set into a mullion sash. The coffers are formed from sheet aluminium finished with a highly reflecting matt white enamel and are lit from below by 42 in. fluorescent lamps concealed in the mullion sash. The advantage of the coffer ceiling over a laylight of flat glass or plastic sheet is claimed to be the more effective horizontal distribution of illumination. P. P.

628.972

34. Maintenance of industrial lighting—Part II.

C. E. EGELER AND R. F. VANDENBOOM. *Illum. Engng.* **48,** 631-635 (*December,* 1953).

Continuation of a study (*Illum. Engng.* **46,** 522 (1951) of the depreciation of illumination in 12 fluorescent installations comprising twin-lamp fittings with closed-top industrial-type reflectors. Measurements made over a period of 25 months at the end of which time further measurements were made after the lamps and then the reflectors had been cleaned. Maintenance factors based on seven different cleaning schedules have been calculated for each installation. The economics of cleaning have been assessed. A correlation has been obtained between the accumulation of dirt on the fittings and the inclination of a test plate to give the same degree of depreciation. P. P.

628.972 : 778

35. True representation photography of interior lighting systems.

E. REBSKE. *Lichttechnik,* **6,** 13-15 (*Jan.,* 1954). *In German.*

The range of luminance in a photographic print cannot exceed about 1 : 25 so that any wider range of luminance in the scene represented is necessarily degraded. The author points out the consequences of this when an attempt is made to give a correct impression of a lighting scheme by means of a photograph. The legitimate use of auxiliary light sources, including daylight, is dealt with and guidance is given on what part of the range of tones should determine the exposure to be given. J. W. T. W.

628.93

36. Basic concept of a utilisation factor for lighting systems.

E. K. MULLER AND H. THUM. *Lichttechnik,* **6,** 16-18 (*Jan.,* 1954). *In German.*

The authors point out that in certain circumstances the utilisation factor of a lighting system may exceed unity. The integrating sphere is used to illustrate the point. They question the advisability of using the German word *Wirkungsgrad* for the utilisation factor, since its primary meaning is "efficiency" and that cannot exceed unity, so that there is an apparent contradiction which may lead to misunderstanding. J. W. T. W.

628.97

37. Application of Fluorescent Dimming Circuits.

H. H. BALLIN AND W. J. VINE. *Trans. Illum. Eng. Soc. (London),* **19,** 29-44 (*No.* 2, 1954).

This paper surveys the use of fluorescent dimming for different lighting applications. Some new dimming circuits are briefly discussed and a short description is given of the lighting equipment. The potentialities of fluorescent stage lighting are considered in the light of experience. The application of fluorescent dimming to colour changing floodlighting of buildings, outdoor illuminations and display lighting is discussed and reference is made to some recent installations. W. R.

The *Lighting* specialists

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Correspondence

" Luminaire."

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—Although your February issue contains one protest against adoption of the term " luminaire," no more cogent objection is raised to it than that it is not to the objector's taste.

As to the alternative suggested by your correspondent, the " good old English word lantern," is, in fact, derived from the French " lanterne," which, in turn, comes from the Greek λαμπας (= a torch, light, lantern or lamp) through the Latin " lanterna." The French " luminaire " is a letter-for-letter " take-over " from " luminaire," which is the Latinised version of the Greek λύχος (= a light, lamp or lantern). There is, therefore, nothing English about the term Mr. Pulvermacher prefers except the omission of the terminal letter it has in the Latin—from which language come " lumen," " luminance," " luminosity," and other of our accepted technical terms, as well as the " imported " " luminaire."

I do not share Mr. Pulvermacher's opinion that " lantern " is more " expressive " than " luminaire," and, as he realises, the popular ideas associated with " lantern " do not include some of those which are intended to be conjured up by the current " sanitary " terms referred to by Messrs. Fahey, Waigh and Bloxsidge. All these ideas could, however, rapidly become associated with a generic term such as " luminaire."

Like ourselves, our American friends are an English-speaking people, but, when they were progressive enough —30 years ago—to propose the generic term in question, they were also sufficiently internationally minded to propose a word which, etymologically, is no more English than is " lantern." You have pointed out, Sir, that, since then, " luminaire " has had considerable use both in and out of the country of its sponsors, and I hope that we in our country will now concede its suitability and henceforward promote its use.—Yours, etc.,

Institute of Ophthalmology,
London. H. C. WESTON.

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—I was very interested in your editorial " Luminaire," which appeared in the January issue of *Light and Lighting.*

I suppose that many of your fellow countrymen are unaware that the French have met the same difficulties as the English in describing what you call a " lighting fitting " and what we call " appareil d'éclairage," a literal translation of that term. In fact, if you look up the word " Luminaire " in a French dictionary, you will find that it denotes the array of lights (l'ensemble des lumières) which, before the days of electric lighting, provided a display, or the lighting of a festival or of a religious ceremony.

Like you, however, we feel the need for a term which is more appropriate than " appareil d'éclairage," and the use of the word " luminaire " has gradually spread, since nothing preferable to it has been found.

Consequently, when we were consulted recently by the C.I.E. in connection with the revision of the first edition of the international lighting vocabulary, introduced in December, 1952, by our colleagues of the Swiss Illumination Committee and the Swiss Electrotechnical Committee, we proposed the adoption of the word " luminaire," with the following definition:—

> LUMINAIRE : An assemblage (ensemble) consisting in general of an optical arrangement, a framework and a support, intended to accommodate a source of light.

We hope that this new meaning of the word " luminaire " will be adopted internationally.

Before concluding, I should like to congratulate you on the new format of your journal, the style of which has been so greatly improved.—Yours faithfully,

H. MAISONNEUVE.

Paris.

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—A fitting, fixture, or luminaire by any other name will always be as sweet provided it embodies all that is sound in engineering and aesthetical design. Thus, instead of squandering time and words in discussing proposals to alter existing and well-understood terms, let more committal energy be devoted to the mechanical and electrical aspects of standardisation.

This subject was lightly touched upon at a recent meeting of the I.E.S., and from the remarks of some of the manufacturers present it would seem that they were waiting to be led down the path of righteousness.

May we dare hope that a body might be set up (assuming that there is not a competent one already in existence) for the purpose of inspecting and testing all new lighting units and issuing the deserving ones with a recognised certificate of merit. This should very soon result in the operation of a " Gresham's Law " in reverse and ensure that, in spite of commercial competition, standards of quality and workmanship could be raised to an " all-time high."

Whatever the decision in respect of new nomenclature, therefore, do not let the final outcome be " Plus ça change, plus c'est la même chose."—Yours faithfully,

London. " ELECTROLIER."

Flameproof Fittings

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—The article which you published on Flameproof, Pressurised and Intrinsically Safe Lighting Equipment in the December number is most interesting. There are, however, one or two points which we feel should be

brought to your notice, so that your readers can be kept fully informed on this subject.

Firstly, on page 475 the author considers Group I Gas (methane) as a whole. This is misleading, as equipment which is certified for Group I must be fitted with glands for armoured cable *only* and must also be robust enough to stand up to mining conditions. When methane is found in situations other than mining, it is more usual to use equipment certified for use in Groups II and III gases and then the user has some choice in the method of cabling.

Secondly, the author's definition of flameproof equipment is only partially correct. It would be absolutely correct if the following words were added: ". . . and complies with the latest edition of any relevant B.S.S." It is necessary to add these words because it is possible for a manufacturer to have obtained a certificate of flameproofness for an article fifteen or thirty years ago under the regulations then in force and to offer it for sale to-day marked with the flameproof registration mark and flameproof number. Many such articles would not be granted a certificate were they submitted for test to-day.

Finally, on page 478 the author remarks that mains-fed handlamps may be considered to be already well known. This statement does not seem to agree with the facts, which are that until recently the Ministry of Fuel and Power refused to grant any certificates to mains-fed handlamps, and it was only in August, 1953, that the first handlamp was granted a certificate (No FLP. 3139, covering Groups II and III gases). The absence of such lamps prior to this was admitted in a previous article on flameproof equipment in your March, 1953, number (page 98). The fact is that until this lamp was introduced last August, there was positively no certified handlamp available for mains use.

J. A. HOLLOWAY.

Simplex Electric Co., Ltd., Oldbury.

Looking Lighting in the Face

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—I have refrained from making any earlier comment on Mr. Robinson's article in the December *Light and Lighting*, for I had expected a howl of protest to be set up by the many commercial interests hurt by his forthright statements. Does the lack of response indicate an absence of interest?

Anyone who knows the author will discern in his light-hearted approach a deep wisdom—and how right he is!

Installations using what may be termed skeletal fittings have been put in most successfully, but as long as lighting design is dictated by fittings salesmen there can hardly be expected to be any general improvement in the direction indicated.

In one minor respect only will I cross swords with Mr. Robinson; there are places where some of the high efficiency of the fluorescent lamp can be sacrificed on the altar of better appearance and where a small fitting, little more than an elementary sheath for the lamp, is adequate, effective and economical.

Intelligent application of the principles advocated could greatly reduce installation costs—could not the new motto of the I.E.S. be extended to " Passim spargere lucem parce? "—Yours faithfully,

Bearsden. C. J. KING.

Lighting of Football Fields

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—I was much interested by the valuable symposium on the Lighting of Football Fields, which appeared in the last issue of *Light and Lighting*, especially in the details of actual installations given in the text. A study of these shows much variety in technique, and it appears that the cost of the job has often been allowed to dominate the picture—sometimes, one would imagine, to the detriment of the quality of the lighting. The remarks made by managers and others suggest that hesitancy in going forward with flood lighting may be due largely to the fact that very few people have seen a really good installation, i.e., truly free from glare.

The necessity of avoiding glare was emphasised by Mr. Pierce in his paper on Sports Lighting presented to the I.E.S. in April of last year, and the point was stressed both in the paper and in the subsequent discussion that flood lighting from high towers was likely to give better results than any other system. This method has been adopted by many of the larger clubs, but they appear to have missed the main feature which is that the towers must be really high—preferably not less than 100 ft.—so that glare is at a minimum.

My own experience of high tower lighting has led to the conclusion that downward rather than near-horizontal projection so improves the seeing power that the effect is better even though the measured illumination may be less. In short, lumens per sq. ft. measured on the field is by no means a safe criterion of a good installation.

ARTHUR CUNNINGTON.

Pulborough, Sussex.

Flameproof Lighting

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—I would refer to the article published in your December issue on the subject of Flameproof Lighting by Mr. H. S. Allpress. I consider that the author's reference on page 476 to the question of painting is much too sweeping. It is certainly inadvisable for flanges to be painted by brush methods, which would tend to leave a coating of substantial thickness, and freedom from " blobs " could not be guaranteed.

It is quite another matter to apply a thin film of appropriate paint under proper controlled conditions at the manufacturers. I have found that using the right type of paint and applying it correctly, a degree of protection is given to the fitting, which is invaluable at any stage of its life.

The paint, of course, must not be of the cellulose type, but it may contain aluminium which has proved to possess valuable anti-rust features.

There is an impression that aluminium paint is unsuitable for hazardous atmospheres where the paint surface can be struck by a flying object.

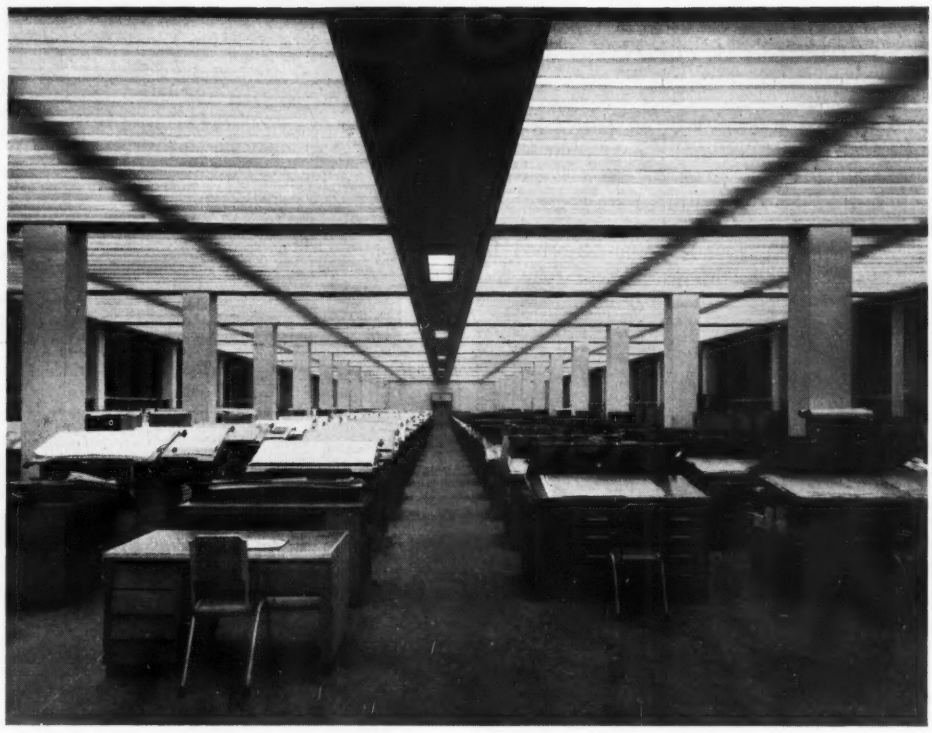
In the cases of flanges under consideration they are not so open to damage, but in any case the surface has to be rusty and at a high temperature before any risk of the so-called thermite reaction can occur.

There are reports available which specify the abnormal conditions necessary for such ignition to become possible.—Yours faithfully,

Solihull. J. J. HUNT.

Lighting Installation

An Office Building



General Information

Post-war expansion in the output from the Heaton Works of C. A. Parsons and Co., Ltd., at Newcastle-upon-Tyne, necessitated a corresponding increase and improvement in the accommodation for research and design work. A new Research and Design building, now completed, incorporates many advanced features in construction and equipment. It was required that the lighting installation should provide a high illumination over large areas of floor space, and to evolve a scheme specially adapted to the needs of a building where, if ordinary ceiling-mounted luminaires were used, the size of many offices would give a false impression of low ceiling height.

Top: The main drawing office.

Below: Section of the ceiling showing the reflectors.

The Installation

The question of a suitable lighting system was studied in the earliest stages of planning the building, and it was decided to provide an illumination of 85 lm./ft.^{2}. A scheme was prepared for embodying intermediate colour cold cathode tubes in the ceiling construction in such a way that over the greater part of their area the ceilings themselves would appear to be sources of light. This has

been achieved by means of rows of reflectors which form the under surface of the ceiling, and run at right angles to the normal direction of view from the office desks and drawing-boards so that the lighting tubes are concealed.

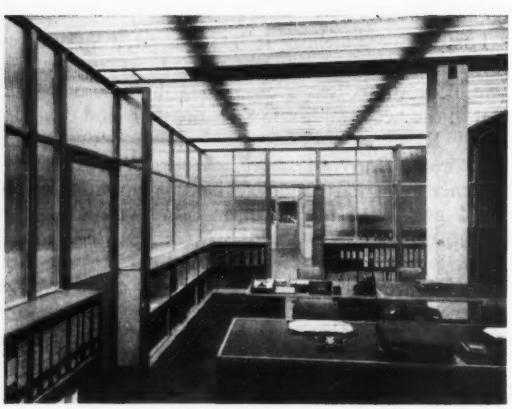
The reflectors are of anodised aluminium, and are perforated to prevent echo, sounds being absorbed by insulating blankets above the fittings. These reflectors also assist the heating system of the building, for the reflectors are clipped to the rectangular hot-water pipes in the ceilings and therefore form a very large radiant panel. The average height of the tubes above floor level in the offices is 12 ft. 6 in. or 9 ft. 6 in.

Close attention was given to the optical design of the reflectors in order to avoid a harsh shadow at their longitudinal junctions. As a result there is nothing to give a definite impression of where the ceiling begins, and this absence of a firm indication of its height is effective in preventing an impression of a low ceiling even when looking down the whole length of such a large room as the mechanical drawing office, which is 220 ft. long by 62 ft. wide. Plastic strips have been mounted along the joint between reflectors to soften the effect further.

The whole lighting installation in this building incorporates some 7,000 Osram intermediate white cold cathode tubes, with a combined length of about 12 miles. Acoustic panels form the ceiling at the ends of, and between, the areas of continuous lighting, and the transformers are concealed above. Four tubes are operated from each transformer. The maximum width of continuously lighted areas is 28 ft. (three tubes end to end). In the spaces between these areas the acoustic panelling is interrupted at intervals by laylights with tubes above which are used as pilot lights. Switching is normally automatic under photo-electric control, which first switches on the tubes in the central areas and then those near the windows.

The entrance hall is lighted by cold cathode tubes installed above 20 laylights. All corridors are normally illuminated by "spill" lighting from offices through glass partitions, but are provided with laylights for use as pilot lights when office lighting is extinguished. Staircases are lit by lines of cold cathode tubes behind glazed panels on the landings.

Designed and installed by: C. A. Parsons and Co., Ltd.



Top: Night view of the exterior.

Centre: The entrance hall.

Below: Typical arrangement on floor subdivided into small offices.

I.E.S. Activities

London

The paper entitled "The Design and Application of Flameproof Lighting Equipment" presented by Mr. D. A. Strachan at the London meeting on February 9 reviewed the relevant factors associated with the construction and application of flameproof lighting equipment and referred to the particular test requirements. It is inevitable that a paper on flameproof lighting equipment must make frequent reference to the appropriate British Standard Specifications, namely, B.S. 229, B.S. 889, both of which govern the major design details of such equipment.

At the outset the author made reference to the principles of "flameproofness" and related this to the more recent experimental research work on the subject. Also, some explanatory notes on the classification of the various hazards met with in industry were included as a matter of interest. The factors which affect the design of flameproof lighting equipment were reviewed; these included various mechanical features and the temperature test requirements. The paper made some reference to the Ministry of Fuel and Power's Research Establishment at Buxton, which is the recognised Testing Authority in this country for flameproof lighting fittings. The tests applied to equipment included the mechanical tests, the tests of flameproofness and the temperature tests. The author devoted a section of the paper to the installation and maintenance of such equipment, and also the statutory regulations affecting its installation in locations where hazardous conditions exist.

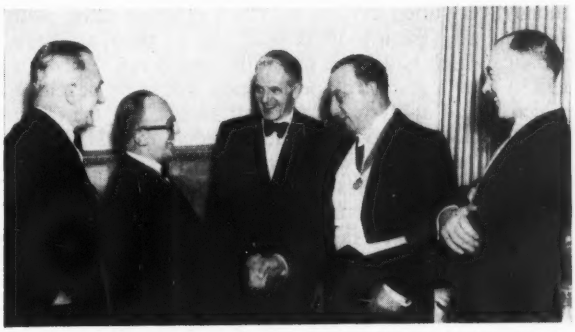
The application of various types of flameproof lighting equipment was discussed, and it was pointed out that, provided the particular hazards are known and appreciated, the application of such equipment then generally follows the technique of normal industrial lighting practice. The present-day range of available lighting equipment of flameproof construction for both tungsten filament and fluorescent lamps was considered.

In conclusion, the author suggested that the appropriate specification dealing with flameproof lighting fittings is, in some respects, in need of revision and extension to meet the developments which have taken place during recent years, and it is hoped that this may receive consideration in the future.

Birmingham Centre

A distinguished gathering of some 200 people, representing many fields in the electrical industry, attended the annual dinner of the Birmingham Centre on January 8, 1954. In the unavoidable absence of the Lord Mayor of Birmingham, his deputy, Alderman W. T. Bowen, J.P., proposed the toast to the Society. Saying how honoured he felt in being called upon to make this proposition, Alderman Bowen referred to the development in electric lighting that there had been during the last 40 years, contrasting most favourably with similar progress in other scientific walks of life. A suitable response was made by the president of the Society, Mr. W. R. Stevens, who commented on the size and power of the Birmingham Centre and the influence it undoubtedly had on the Society's activities. He referred, in the course of his speech, to *Light and Lighting*, and informed his audience that this excellent journal was sent to 44 overseas countries. He concluded by congratulating the Centre on having such stalwarts as Messrs. Long and Watson, referring to the distinction of honorary member of the Society conferred on the former, and that of election to vice-presidency, earned by his hard work, of the latter.

Mr. Howard Long, chairman of the Centre, proposed the toast of the guests, to which Mr. C. F. Partridge, chairman of the Birmingham Electric Club, replied. Mr. F. W. Haynes, vice-chairman of the Centre, proposed a toast to the chairman, Mr. Howard Long.



At the Birmingham Centre annual dinner on January 8. Left to right: Mr. H. B. Mellor, Alderman W. T. Bowan, J.P., Mr. Howard Long (chairman), The President, Mr. G. R. Hanson.

At the Edinburgh Centre dinner dance held on January 15. Left to right: The President, Miss Buckley, Mr. W. Crawford (chairman), Mrs. Stevens, Dr. Buckley, Mrs. Comrie.

On January 12 the Birmingham Centre held a joint meeting with the University of Birmingham Engineering Society (Electrical Section). The meeting took place in the lecture theatre of the union, Birmingham University, and a paper entitled "Applied Lighting" was given by Dr. E. H. Norgrove. The lecture was of a simple nature dealing with various methods of maintenance, and Dr.

Norgrove was deliberately controversial, his aim being to attract questions of a similar nature. A vote of thanks to Dr. Norgrove was proposed by the president of the University Society, who said he hoped that this present meeting would be the forerunner of similar gatherings in the future.

At a further meeting of the Centre on January 29 Mr. M. W. Peirce gave a paper on "Lighting for Sport" in which he dealt with the lighting of all types of sport, including boxing, football, cricket, greyhound racing and speedway racing.

Dealing first of all with the economics of lighting sports arenas, Mr. Peirce pointed out that, with careful management, a heavy capital outlay could be avoided. The exception to this was probably in the case of floodlighting football fields, where, in order to achieve a result satisfactory to both spectators and players, an amount of money, very often beyond the reach of small clubs, would be required. Each football field had its peculiar characteristics which had to be carefully considered. Nevertheless in time a standard specification would be developed, which would apply to all football arenas. In the discussion that followed Mr. "Teddy" Eden, of B.B.C. fame, displayed a deep knowledge of the subject of the paper. Among the various disadvantages of floodlighting football fields were those of transport. Mr. Eden pointed out that matches took place in the evening after the peak rush hour, and thousands of people had to be taken home by local transport long after this, thus creating another peak hour. So far local authorities were finding great difficulty in coping with this problem. Mr. Eden thought that floodlighting of football fields had a great future, but there were many problems still to be overcome.

Glasgow Centre

At the Glasgow Centre meeting on January 6 Mr. R. G. Cox, of Birmingham, read his paper entitled "The Architects Approach to Lighting." In this most interesting paper there was a real appreciation of the lighting engineer's position in relation to architecture as a whole. Initially the audience were given a short résumé of interior line and form and the blending of lighting, either tailor-made or in stock unit form, into the finished interior. The author then described the architect's point of view of an interior as a setting for drama. In putting forward this point of view due recognisance was paid to the requirements of utility and lighting efficiency.

The excellent description of the lighting and decoration of the interior of a modern power station exploited fully the sense of drama, while the description of an industrial interior showed that the architect is not neglectful of utility and long-term practical efficiency. The lecture was illustrated by slides showing lighting schemes which were the subjects of co-operation between architects and lighting engineers and showed the excellent results obtaining therefrom.

There is nothing like an argument between two members of opposing camps to stimulate an audience into discussion, and it was with this in mind that the Glasgow Centre arranged an evening devoted to street lighting; F. N. Rush, representing the manufacturer, and J. M. Ward, Glasgow's Inspector of Lighting, set the ball rolling on the evening of February 4, with Mr. Quinn in the chair.

In an effort to forestall criticism of his own installations J. M. Ward said that they were not complacent about conditions, but they were suffering from a general limitation imposed by finance, and from a relic of pre-war days —there were still 9,000 gas lamps at 9 ft. mounting height. The great extension of housing schemes took up more and more of the available resources, and they had to spend large sums on stair lighting. Out of a budget of £1,000,000 stair lighting alone took £450,000, yet in spite of all their difficulties they claimed that in Glasgow they had a better over-all lighting than in any comparable city. They did not light a few main roads well to the detriment of the by-ways.

He asked for assistance from lamp makers by the production, at a reasonable price, of mercury discharge lamps, burning 4,000 hours—one lighting season in Glasgow. Referring to lanterns he suggested that the advances of recent years in optical design had not been matched by mechanical features.

They saw little objection in Glasgow to discharge lighting even in shopping streets. There was now unlimited shop window lighting and, anyway, the few hours of shopping during lighting hours were unimportant compared with the admittedly greater safety value of these lamps.

The manufacturers' part was ably taken by F. N. Rush, who replied largely from his position as a designer of lanterns. In spite of Mr. Ward's somewhat caustic comments about lanterns he felt it necessary to stress the difficulties which beset the manufacturers. They, too, were bound by financial considerations, and the development which had been going on was an expensive matter. There had been great advances as Mr. Ward said, and there was an increasing awareness of the external appearance of the lantern. Although Mr. Ward wanted a cheaper range of equipment, which would bring an increased demand and thus justify the lower prices, it was his view that it was not reasonable to expect a manufacturer to lay down a long-term policy of this nature when there were so many changes likely in the near future. After all, we might well have an entirely new lamp to deal with. As for shopping centres he agreed with the majority who saw no alternative to fluorescent lighting for this purpose.

In the general discussion J. M. Brodie, of Ayr, said some forthright things about the national policy and advocated some form of national responsibility for larger lighting areas. Standardisation, and thence, lower costs would be facilitated, and greater Government assistance would be available for this "Cinderella" of local services. His comments on the backwardness of Glasgow in the inter-war years, when financial limitations were not so severe were endorsed by other speakers. Mr. Capes, from Ayrshire, complimented the electricity boards on their rationalisation of tariffs, which even if it did not improve Glasgow's position, certainly assisted smaller authorities. He also asked for the issuing of specifications to be the responsibility of local authorities, and not of manufacturers. Other speakers, however, doubted the ability of many authorities in this respect.

Many other speakers took part in the discussion, including Messrs. Goodwin, Ferguson, Rigg and King and the vote of thanks to the speakers who had so ably withstood all the onslaughts, was proposed by John Wilson, Public Lighting Engineer of Paisley.

Leeds Centre

For the first meeting of the Centre in 1954 Miss Daphne Vince, of the University of Reading, presented a paper on "The Effect of Light on the Growth and Development of Plants." Miss Vince spoke of research work carried out in this country and on the Continent, and her excellent treatment of the subject aroused much interest and provoked a lively discussion amongst the audience of eighty members and their guests. Mr. L. G. Knight, Deputy Director of Parks for the City of Leeds, opened the discussion and spoke with enthusiasm on the value of artificial light sources to the practical horticulturist.

Manchester Centre

At the Centre meeting held on December 10 a paper was presented by Mr. W. T. F. Souter on "Church Lighting." Mr. Souter pointed out that there was no really set formula which could be applied to church lighting since each individual installation presented its own particular problems and challenges to the lighting engineer. He suggested that in churches the aesthetic aspect of illuminating engineering was a major consideration and must demand careful consideration if success was to be achieved.

Mr. Souter, by means of lantern slides, showed the effect of different methods of lighting upon architectural features, and then went on to state that the problem of church lighting could be divided into two stages, the first dealing with the physiological and psychological requirements, and the second being concerned with the practical and aesthetic considerations which will influence the application of the data collated in stage one.

Under the heading of physiological and psychological requirements, Mr. Souter dealt with the questions of (a) illumination values in the various parts of the church; (b) glare, with particular reference to fittings brightnesses, background brightnesses and the separation angle between the line of vision and the fittings angles, and (c) tunnel effect.

When dealing with the practical and aesthetic considerations, the speaker referred to the five broad types of distribution available and considered situations in which each type of distribution would find application.

Mr. Souter said that financial considerations naturally had bearing on the final composition of the lighting scheme, but warned against the situation where price prejudiced the final result. He then made brief reference to coefficients of utilisation in design, and said that the lighting engineer must be careful in his choice of coefficients remembering the open nature of many churches and the low reflection factors which frequently applied. He concluded by showing lantern slides of many church lighting installations, bringing out points of interest. Of particular appeal were slides dealing with the lighting of Westminster Abbey for the Coronation Service.

The discussion was opened by Mr. F. Cantrell, who stated that he was in agreement with Mr. Souter on all major points. He said that the comparatively recent introduction of fluorescent lighting to churches introduced new problems and that fluorescent installations must be approached with extra care. Mr. Cantrell illustrated by lantern slides two churches recently lit successfully using fluorescent lamps and referred to the problems associated with each.

In a long discussion in which members and visitors took part reference was made to the care necessary in order to ensure that lighting effects were not too "stagey," to the problems of pulpit lighting, to the lighting of church ornaments, and the difficulties of maintenance. Mr. Souter dealt with all contributions in a most expert manner.

Sheffield Centre

The December meeting of the Sheffield Centre took the form of a popular lecture entitled "Modern Trends in Cinematograph Picture Presentation," which was presented by Mr. A. P. Catellain. There was an audience of over 220 members and visitors.

The speaker explained the various systems of true stereoscopic and panoramic presentation and described, in detail, the equipment needed and the light requirements in each case. The problems involved in obtaining sufficiently bright pictures were dealt with and probable trends in the immediate future were outlined.

A demonstration of stereoscopic 16 mm. film was given at the end of the lecture, and this was followed by a lively discussion concerned mainly with future screen developments and the effects of picture-surround colour.

At the January meeting, Mr. R. L. C. Tate gave a lecture entitled "Lighting of Churches." Mr. Tate emphasised that a wide variety of architecture was found in ecclesiastical buildings and that church lighting was complex because each church had its own specific problems making it impossible to generalise. Lighting problems were closely associated with visual appreciation of beauty and dignity of the church interior.

Some time was spent defining architectural terms, many of which are not commonly known, and in describing various types of church roof. Mr. Tate then went on to discuss concealed lighting, pendant fittings, indirect lighting, problems of lighting galleries and choir stalls, applications of fluorescent lighting to existing buildings, and difficulties of maintenance. Mention was made of the problems involved in revealing beauty and craftsmanship, lighting stained-glass windows, types of wiring and avoidance of distraction and glare. The various topics were well illustrated with slides.

Forthcoming I.E.S. Meetings

LONDON

March 9th

Sessional Meeting. "Flicker in Relation to Interior Lighting," by J. B. Collins and R. G. Hopkinson. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

March 23rd

Descriptions of New Lighting Installations. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2) 6 p.m.

CENTRES AND GROUPS

March 3rd

EDINBURGH.—"Church Lighting," by L. C. Rettig. (At the Conference Room, Manor Club, 12, Rothesay Place, Edinburgh, 3.) 7 p.m.

NEWCASTLE.—"Dark Adaptation and Miners' Nystagmus," by W. J. Wellwood Ferguson. (At the Connaught Hall Y.M.C.A., Blackett Street.) 6.15 p.m.

SWANSEA.—Informal Meeting. Three Papers followed by discussion. (At the Minor Hall, Y.M.C.A., Swansea.) 6.30 p.m.

March 4th

CARDIFF.—"Glass in the Lighting Industry," by J. G. Holmes. (At the South Wales Electricity Board's Demonstration Theatre, The Hayes, Cardiff.) 5.45 p.m.

GLASGOW.—"Aerodrome Lighting," by A. V. Campbell. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 6.30 p.m.

GLOUCESTER AND CHELTENHAM.—"Some Aspects of Department Store Lighting," by A. W. Jervis. (At the Cadena Cafe, High Street, Cheltenham.) 6.30 p.m.

NOTTINGHAM.—Brains Trust. (At the Demonstration Theatre of the East Midlands Electricity Board, Smithy Row, Nottingham.) 6 p.m.

March 8th

SHEFFIELD.—"Fashion and Creative Photography in Advertising," by J. Short. (At the Medical Library, The University, Western Bank, Sheffield, 10.) 6.30 p.m.

March 9th

STOKE-ON-TRENT.—"Lighting of Film Studios," by H. M. Ferguson. (At the Lecture Hall of the Midlands Electricity Board, 31, Kingsway, Stoke-on-Trent.) 6 p.m.

March 10th

HUDDERSFIELD.—"New Lamps, New Uses and New Lighting Techniques," by R. V. Mills. (At the Yorkshire Electricity Board's Showrooms, Market Street, Huddersfield.) 7.30 p.m.

March 11th

MANCHESTER.—"Street Lighting Costs," by T. L. Robinson. (At the Demonstration Theatre of the North Western Electricity Board, Town Hall Extension, Manchester.) 6 p.m.

March 12th

NOTTINGHAM.—Ladies' Evening. (At the Victoria Station Hotel.)

March 16th

LIVERPOOL.—"Outdoor Illuminations," by H. Carpenter. (At the Merseyside and North Wales Electricity Board's Service Centre Lecture Theatre, Whitechapel, Liverpool.) 6 p.m.

March 17th

NORTH LANCASHIRE.—"Outdoor Illuminations," by H. Carpenter. Joint meeting with Preston Branch of the Association of Supervising Electrical Engineers. (At the Demonstration Theatre of the North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"Lighting in Schools," by J. S. Howell. (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.30 p.m.

March 22nd

BIRMINGHAM.—"Stage Lighting from the Producer's Viewpoint," by Norman Leaker and Arthur Taylor. (At the Crescent Theatre, Birmingham.) 6 p.m.

LEEDS.—Annual General Meeting, followed by a film on The Manufacture of Glass. (At the Lecture Theatre of the Lighting Service Bureau, 24, Aire Street, Leeds, 1.) 6 p.m.

LEICESTER.—"Glass in the Lighting Industry," by J. G. Holmes. (At the Demonstration Theatre of the East Midlands Electricity Board, Charles Street, Leicester.) 7 p.m.

March 26th

BATH AND BRISTOL.—"Hospital Lighting," by D. J. Reed. (At the South Western Electricity Board Lecture Theatre, Colston Avenue, Bristol.) 6.15 p.m.

Trade Literature

FALK, STADELMANN & CO., LTD.—This Company's first complete catalogue of Contemporary Lighting Fittings, No. 800. It is well illustrated and gives details and prices of each fitting.

TUDOR ACCUMULATOR CO., LTD.—Four illustrated and priced leaflets: No. 90, the "Safetylyte," Major Emergency Lighting Equipment for hospitals and all public buildings; No. 91, the "Safetylyte" Major Emergency Lighting Equipment for cinemas, theatres, dance halls and other places of entertainment; No. 92, the "Safetylyte" Minor Emergency Lighting Equipment for hospitals, nursing homes, schools, fire stations, public stations and similar premises; No. 93, "Safetylyte" Switch Relays.

DEWHURST & PARTNER LTD.—Brochure giving well illustrated information on varied forms of electric control gear and numerous types of auxiliary switches.

THE GENERAL ELECTRIC CO., LTD.—A new publication entitled "Ironclad Switchboard Components" giving a detailed illustrated description of the company's range of standard ironclad switchboard components including cable boxes, busbar chambers, switch supports and meter chambers, all of which are available from stock.

S. L. R. ELECTRIC, LTD.—A well illustrated catalogue presenting various types of electric light fittings including a separate price list.

TROUGHTON AND YOUNG (LIGHTING), LTD.—Two new brochures giving illustrated details of "Mondolite" and "Versalite" fittings including prices.

THE SUN ELECTRICAL CO., LTD.—Catalogue containing details of a wide range of commercial, industrial and fluorescent fittings, signs, time switches, etc., including illustrations and prices in each case.

LINOLITE, LTD.—Illustrated leaflet No. 16/4 describing in condensed form the complete range of strip reflectors, decorative fittings and signs. A forerunner to a new catalogue to be issued shortly.

THE BRITISH THOMSON-HOUSTON CO., LTD.—The new Mazda Lamp Catalogue giving full details in tabulated form. Including also illustrated details and prices on lighting equipment and fittings.

J. A. CRABTREE & CO., LTD.—A publication illustrating a new range of starters, type D-6 hand-operated starters, including full details and prices.

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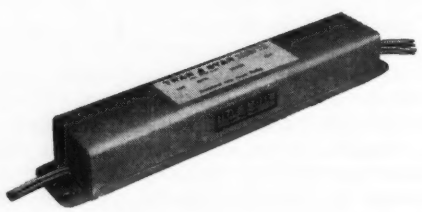
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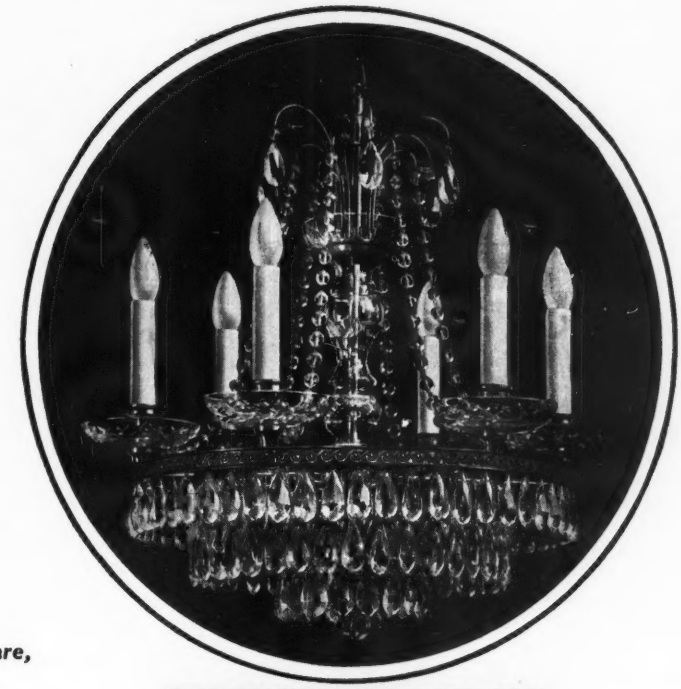

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GLASSEXPORT
PRAHA—CZECHOSLOVAKIA

Physical Society Exhibition

The thirty-eighth (1954) Annual Exhibition of the Physical Society will be held at the Imperial College of Science of Technology, Imperial Institute Road, London, S.W.7, from Thursday, April 8, to Tuesday, April 13, 1954. Applications for tickets should be made to the Secretary-Editor at the offices of the Society, 1, Lowther Gardens, Prince Consort Road, London, S.W.7. A stamped addressed post card must be enclosed.

Extreme pressure on space will make the thirty-eighth Exhibition slightly smaller than that of previous years, but this reduction in size will be compensated by the high standard of the exhibits. Particular care has been taken to ensure that the standard of entries is higher than ever before and a large proportion of new or novel equipment will be on show. As in previous years a comprehensive Handbook of the Exhibition will be available at the Exhibition; copies can also be obtained on application to the Secretary-Editor at the address given above. The price of the publication is 6s. (by post 7s. 3d.).

SITUATION VACANT

Lighting fittings REPRESENTATIVE required to operate in Birmingham and Black Country area with fluorescent lighting manufacturer whose factory is situated in Birmingham. Experience in this capacity. Please give details of age, qualifications, and indication of salary required.—Reply Box No. 858.

Personal

Ekco-Ensign Electric, Ltd., announce that MR. A. MILLER has been appointed Midlands Area Manager and is now operating from the Birmingham Sales Office and Depot at 40-42, Summer Row, Birmingham, 3; also the recent appointment of MR. J. W. COOK as their representative covering certain South Western postal districts of London and the Greater London area in Surrey. Mr. Cook operates from the Company's Southern Sales Office at 45, Essex Street, Strand, London, W.C.2.

MR. F. E. LONDON, who is representing Venner, Ltd., in the Yorkshire and North Eastern Electricity Board Areas, has set up residence at 21, Penlys Grove Street, York, where he will be pleased to receive correspondence and inquiries. His telephone number for the time being is York 53464 until more permanent arrangementss can be made.

MR. J. ASHMORE, F.I.E.S., of British Electrical Repairs, Ltd., of Birmingham, has been made a fellow of the American Institution of Electrical Engineers.

MR. G. J. CHAMBERLIN, of The Tintometer, Ltd., will be visiting America from June 8-July 14 during which time he will be attending the American Society for Testing Materials Convention in Chicago and the Congress of Canadian Institute of Chemistry in Toronto as well as visiting Cincinnati, Washington and New York.

MR. L. C. RETTIG, F.I.E.S., has joined the Commercial Engineering Department of Siemens Electric Lamps and Supplies, Limited, as lighting engineer for Scotland. He will be based at their Glasgow Branch.

POSTSCRIPT By "Lumeritas"

Although this journal is the only one in this country which is specifically devoted to lighting, it is not in the least surprising that many other journals publish occasional articles on the subject, for it is one which concerns everybody who has the precious faculty of sight. Since writing last month I have noticed articles dealing with lighting in at least a dozen journals—some technical, others popular—and doubtless there have been more. Not all of these articles are as sound as one could wish, though most of them are reasonably good as far as they go. One of them, entitled "The Englishwoman's Castle," published in "The Listener," probably reached a very wide public, since it was also given as a broadcast talk. Its author, Prof. V. H. Mottram, is a physiologist, whose remarks on lighting are not influenced by any commercial interest. He pleads for more daylight and artificial light in the home. "Our homes rarely have either enough daylight, enough general artificial light, or sufficient points for local light." "Of artificial light," he says, "there can rarely be too much," and he advocates fluorescent general lighting. For local lighting he suggests that at least one point per member of the family should be provided in the living-room. His article is accompanied by photographs of his own home, which show that he practises what he preaches. Among the other articles which have come to my notice is one by a motorist making reference to "the usual dazzling and confusing ordinary street lamps by contrast with sodium discharge lamps." I wonder how widely this opinion of "ordinary" street lamps is shared?

The paper on "Studies in Interior Lighting," which Mr. J. M. Waldram presented at the January meeting of the Illuminating Engineering Society in London, brought to our notice once again the subject of apparent or subjective brightness, and the importance in lighting design of taking account of the adaptation of the visual process to brightness. The paper reminded me that another past-president of the I.E.S., Mr. A. W. Beuttell, took a lively interest in apparent brightness, and as far back as 1913 he was granted a patent covering an instrument for comparing the photometric brightness (i.e., luminance as we now say) of an object with its subjective or apparent brightness. The subject received little further attention for many years, but it continued to interest Mr. Beuttell, who submitted a memorandum on the measurement of subjective brightness to the Technical Committee of the I.E.S. in 1938. He also stimulated experimental work on the subject by the late Dr. K. J. W. Craik at Cambridge. Prof. W. D. Wright also worked on this subject and presented several papers dealing with it to the Society. (Trans. I.E.S., Lond. **4**, 1, 1939, **6**, 23, 1941, and **7**, 43, 1943.) Mr. Waldram's paper is very "meaty," and deserves careful reading when it appears in print, for it outlines a new lighting design procedure. When presenting his paper Mr. Waldram described some temporary modifications made to an existing installation so as to achieve his planned apparent brightness pattern in a particular interior. His audience was amused by one of the expedients he employed to obtain the desired effects—which was to stick pieces of paper in appropriate positions on some of the luminaires. This inspired one of his listeners to produce the accompanying sketch. I hope this may amuse readers as much as I think it will amuse the author of the paper, who, incidentally, is himself an accomplished "doodler"!

"Pass up another bit of sticky paper, Bert, we've still got too many flipping foot-lamberts on the side wall."

The relation of lighting to "visual comfort" is much discussed nowadays, but often without any explanation—clear or otherwise—of what is meant by "visual comfort." It is refreshing, therefore, to find that in one of the most recently published contributions to the subject (The Design of the Visual Field, Trans. I.E.S. Lond., **8**, 225, 1953) a conception of visual comfort is stated fairly explicitly, even if it is one that may not be generally acceptable. The statement reads, "Visual comfort implies the sense of pleasure, well-being and satisfaction evoked by the whole visual scene. The pleasure induced by the specific content of the scene is not included here, but only the satisfaction of being able to appreciate the content in an unhampered and stimulating manner. The kind of visual comfort and the way it is achieved will differ in a restaurant, a church, an office, or a dance-hall. Although visual comfort requires the elimination of causes of discomfort it is more than the mere absence of discomfort, which may be vague and flat, and it may involve stimulating lighting to provide centres of interest." I wonder what my readers will think of this, and how they would themselves define "visual comfort"? I have put this question to a few friends—both "lay" and "scientific"—and each has given me a different answer, although every answer has been in negative terms, e.g., "To me, visual comfort means freedom from any sense of strain or discomfort in seeing." On the other hand the statement I have quoted above refers to visual comfort as something "more than the mere absence of discomfort." If any readers have definite views on this subject which they can put in the form of a definition, I should like to hear from them—but no prize is offered for the most satisfactory definition received.